

Reading Minds, Reading Stories: Social-Cognitive Abilities are Related to Linguistic Processing of Narrative Viewpoint

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Introduction. Narratives have a unique ability to disclose the inner worlds of others, leading various scholars to argue for a relationship between exposure to narratives and social-cognitive abilities such as empathy and theory of mind (e.g., Hakemulder, 2000; Mar & Oatley, 2008; Zunshine, 2006). One of the ways in which narratives can represent the inner worlds of characters is through the use of viewpoint markers, i.e., lexical elements that signal that a part of the narrative has to be constructed from the subjective viewpoint of a character (van Krieken et al., 2017). In this study, we investigated the link between narratives and social cognition by studying how the linguistic processing of viewpoint is related to social-cognitive abilities.

Method. Eye-tracking data was collected from 90 participants reading a Dutch 5000-word narrative that was scored for the presence of lexical markers of perceptual (PVP; e.g., *to listen, unrecognizable*; 93 words), cognitive (CVP; e.g., *to want, sceptic*; 148 words), and emotional viewpoint (EVP; e.g., *to feel, desperation*; 59 words) using a validated identification procedure (Eekhof et al., 2020; $\kappa = .82$). In addition, various social-cognitive measurements were collected, including the Interpersonal Reactivity Index (IRI; Davis, 1983; $\alpha = .83$), a Visual Perspective-Taking Task (VPT; Samson et al., 2010), and the Spontaneous Theory of Mind Protocol (STOMP; Rice & Redcay, 2015), a measure of the spontaneous tendency to mentalize.

Results. We used (generalized) linear mixed models to study the effect of PVP, CVP, and EVP markers on gaze duration, skip rate, and rereading rate using non-viewpoint marking content words as a baseline, and controlling for word length, frequency, and print exposure (Author Recognition Test; Stanovich & West, 1989). We found that PVP markers were read faster ($\beta = -3.54$ ms, $p = 0.01$), whereas markers of EVP ($\beta = 4.83$ ms, $p = 0.002$) and CVP ($\beta = 4.87$ ms, $p < .001$) were read slower compared to non-viewpoint markers. Furthermore, the odds of skipping were decreased by both CVP (by 0.71 times, $p < .001$) and EVP markers (by 0.88 times, $p < .001$). Finally, EVP markers increased the odds of rereading by 1.16 times ($p < .001$). Crucially, the effect of viewpoint markers on skip rate and rereading rate was found to interact with individual differences in social-cognitive abilities. IRI scores increased the odds of skipping PVP markers by 1.13 times ($p < .001$). Altercentric intrusion scores (i.e., altercentric interference during egocentric perspective-taking) on the VPT decreased the odds of skipping CVP markers by 0.95 times ($p = .02$). Finally, egocentric intrusion (i.e., egocentric interference during altercentric perspective-taking) increased the odds of rereading CVP markers by 1.08 times ($p = .01$).

Conclusion. We found diverging patterns of reading behavior for perceptual viewpoint markers on the one hand, and emotional and cognitive viewpoint markers on the other, suggesting that the processing of emotional and cognitive viewpoint is possibly more effortful (see also Mak & Willems, 2018), whereas the processing of perceptual viewpoint is rather fast. Interestingly, these findings align with developmental literature showing that perception verbs are generally acquired before cognitive verbs (e.g., E. E. Davis & Landau, 2020). Moreover, our findings reveal an interesting interplay between linguistic and social-cognitive processing and suggest that readers with relatively poor social-cognitive abilities are also slower to process linguistic elements related to the emotional, cognitive, and perceptual viewpoint of fictional others (as evidenced by decreased skipping and increased rereading); perhaps because these readers need to rely more on these explicit markers to make sense of the inner world of story characters. Although more research is needed to shed light on the causal mechanisms behind this relationship, this study underlines the promising role of narrative viewpoint techniques in the study of the social-cognitive potential of narratives.

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